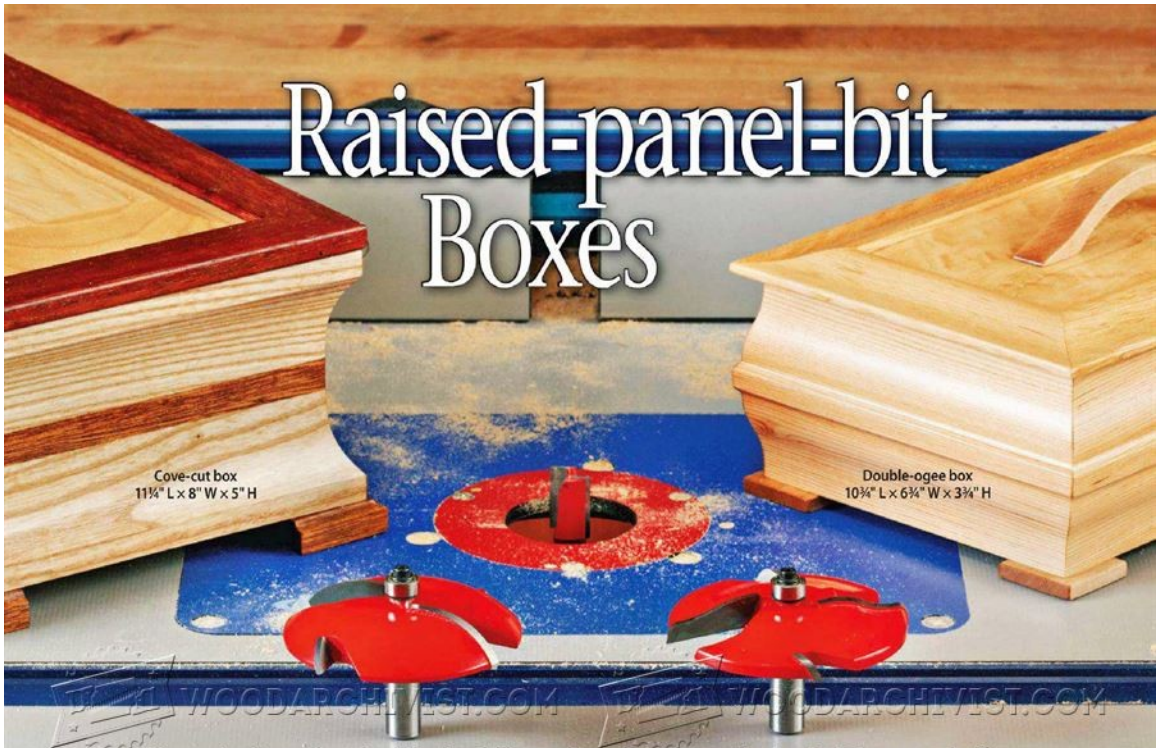
Raised-panel-bit Boxes



Your raised-panel router bits should be making dust, not gathering it sitting on a shelf. Put them to work crafting beautiful boxes with this unique technique.

Erv Roberts

While shooting the breeze with WOOD® *magazine contributing craftsman Erv Roberts in his shop recently, we started talking about our love/hate relationship with raised-panel router bits. Nothing makes cabinet-door panels as efficiently, but the cost of a good bit—as high as $130—makes it hard to justify unless you're going to make a lot of doors. As the conversation went on, I could see the wheels turning in Erv's head, and a week later he dropped by the office with a bunch of stunning boxes he had just made using his raised-panel bits. Our staff liked them so much, we talked Erv into sharing his technique with you.*

Bob

—**Bob Hunter**, Tools Editor

Small boxes—whether for storing jewelry, photos, keys, or keepsakes—provide a perfect opportunity to get creative with wood selection. If you have a special board or two set aside, or cutoffs from a previous project, here's a great opportunity to put them to good use.

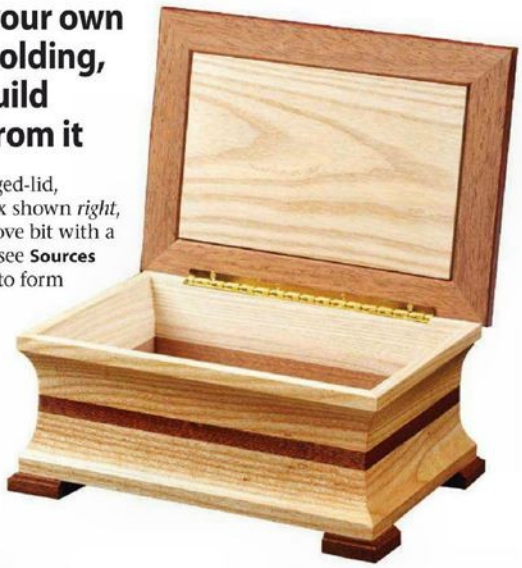
We made the two boxes shown here from combinations of complementary wood species: ash and mahogany for the cove-cut box (*above left*), and Douglas fir and maple for the double-ogee box. Rather than provide dimensioned plans for each box, we lead you through the step-by-step process for making them. We give key dimensions or proportions when needed, but allow you to design and build to suit your taste, tools, or materials. You can substitute your own bits to create different profiles.

A few tidbits about using raised-panel bits

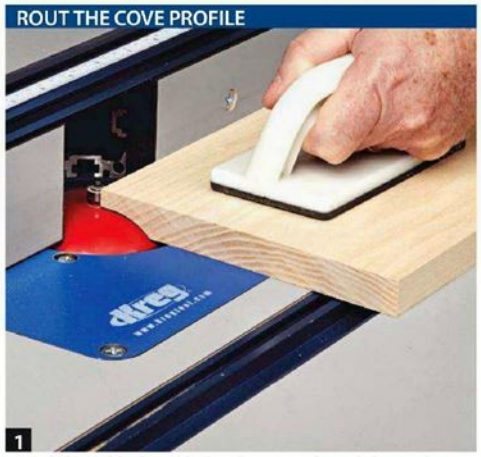
- Choose a bit with a ½" shank for less chatter and a cleaner cut compared to one with a ¼" shank.
- Use a table-mounted router—never a handheld one—with at least a 2¼-hp, variable-speed motor.
- Run the router at about 10,000–12,000 rpm when spinning a raised-panel bit.
- Fix either the fence location (our preference) or maximum bit height before routing, and then leave it alone. You'll make incremental adjustments to the other as you rout the profile in steps.
- Always rout end grain (if any) first, then progress around the workpiece, alternating ends and edges.
- If your raised-panel bit has a backcutter, as shown *below*, remove the cutter, nut, and washers before routing box profiles. (The backcutter cuts raised-panel "tongues" to exact thickness for fitting into the rail and stile grooves on cabinet doors, but gets in the way for box-making.)

Make your own cove molding, then build a box from it

For the hinged-lid, cove-cut box shown *right*, we used a cove bit with a 1½" radius (see **Sources** on *page 59*) to form the profile for the box sides and lid panel.

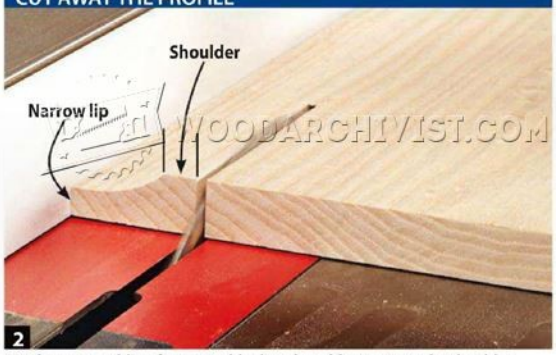


ROUT THE COVE PROFILE



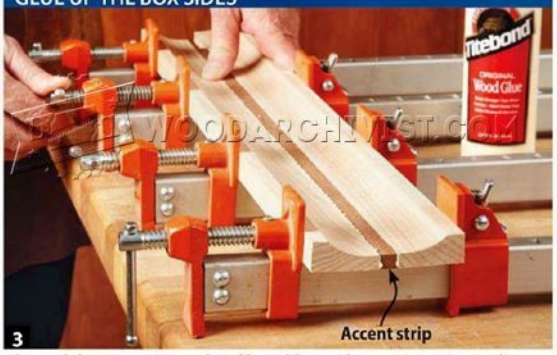
Start with two blanks ¾" thick, at least 4" wide, and about 2' long to make four cove moldings. With the fence set flush with the bit's bearing, raise the bit in increments of ⅛" or less as you rout the profile to minimize strain on your router and tear-out to the wood. Stop routing when the narrow lip is about ⅜" thick.

CUT AWAY THE PROFILE



Rip the cove molding from your blank at the tablesaw. Keep the shoulder width equal to ¼ or ⅓ that of the routed profile for good proportion.

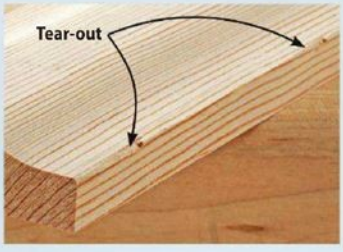
GLUE UP THE BOX SIDES

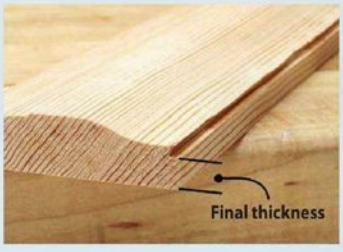


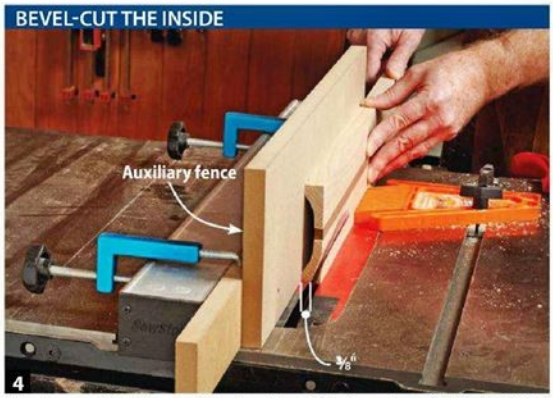
Glue and clamp two pieces of profile molding with an accent strip equal in thickness to the narrow lip, and no wider than ½" to avoid a broad flat area in the box profile. Make sure all three pieces rest flat against the clamp bars as you tighten. Sand smooth when dry.

Thwart bit tear-out with a quick, preventive cut

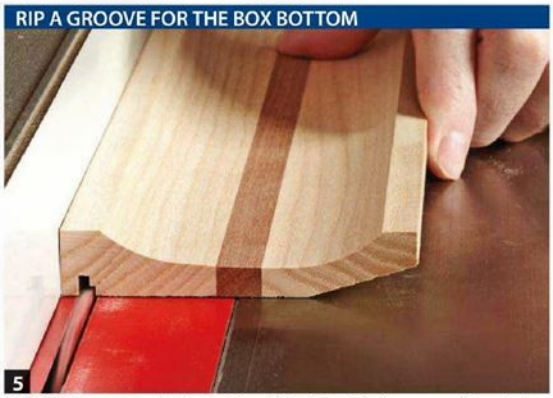
Some wood species—especially figured woods with interlocking grain—simply prove more susceptible to tear-out when routing edge profiles. For example, the riftsawn Douglas fir blanks we used for the double-ogee box kept splintering as we routed the profiles for the sides and lid, as shown *below left*, even when running the router at the appropriate speed, taking a shallow cut, and feeding the wood slowly. To prevent this, rip a shallow groove along the edge at the tablesaw, *below center and right*, establishing the final thickness of the profile's low point. Then continue routing in shallow increments (1/16" just to be safe) until the saw kerf disappears.





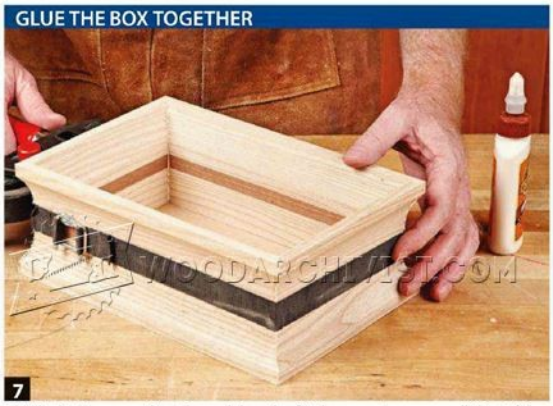


Attach an auxiliary fence—taller than the width of your box-side blank—to the rip fence. Then, rip a 15° bevel along only the top inside face to lighten the look. Leave the remaining wall thickness at least ⅜" to avoid weakening it.



Cut a ¼"-deep groove for the bottom. Make this cut in two passes, if needed, testing the fit with the bottom panel—we used ¼" plywood—while setting up the second pass.

With a crosscut blade (60–80 teeth) tilted to 45°, cut a miter on each end of both box-side blanks. Clamp a mitered stopblock to a miter-gauge extension, and cut the long sides to length. Reset the stopblock and cut the shorter sides.

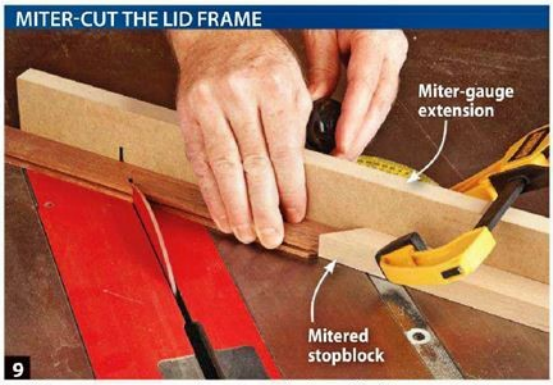


Cut the bottom panel to size and do a dry-fit clamp-up to ensure all joints fit tightly. Finish-sand the inside surfaces. Apply glue liberally to each miter—end grain soaks up a lot—and clamp the assembly with a band clamp.

Now craft a raised-panel framed lid

In addition to the raised-panel bit you used in making the box sides, you'll need a ¾" straight or ½" spiral bit and a ⅛" round-over to make the lid, which consists of a mitered frame with a solid-wood panel contained within.

From the same wood as the accent strips, machine two ⅜"×1¼"×2' lid-frame blanks. Cut a centered ⅛" groove ¼" deep along one edge of each blank to hold the lid's raised panel. Rout ⅛" round-overs on all edges.



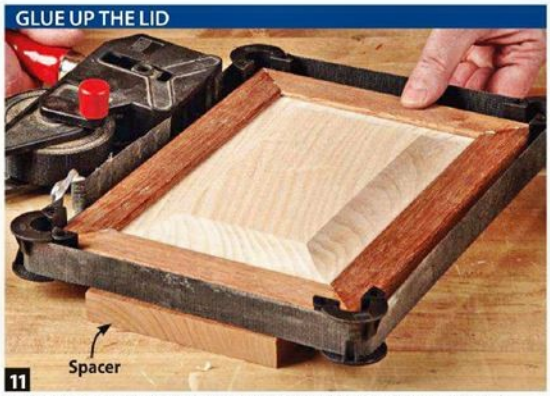
With the miter gauge turned to 45° and the frame blank's grooved edge forward, cut a miter at each end. Next, use a mitered stopblock to ensure equal lengths for matching parts, and miter-cut the lid-frame pieces to length.

FORM THE LID PANEL

10

After cutting the lid panel to fit the frame, rout the cove profile with the raised-panel bit. Then, using a ¾" straight bit, rout a rabbet in the back side, leaving a "tongue" that fits into the lid-frame groove.

GLUE UP THE LID



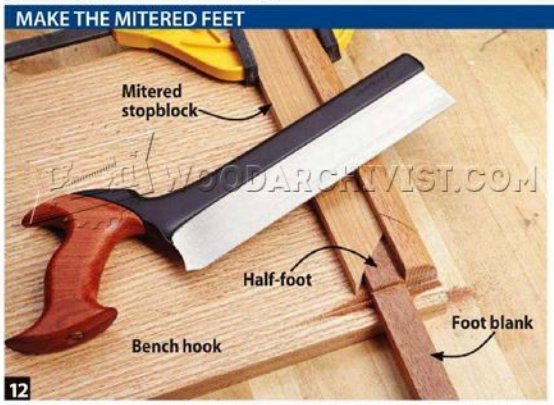
11

Finish-sand all parts, then glue and clamp together the lid frame with the raised panel floating unglued in the grooves. To better support and center our ⅜"-thick frame in the band clamp, we elevated it on a scrapwood spacer.

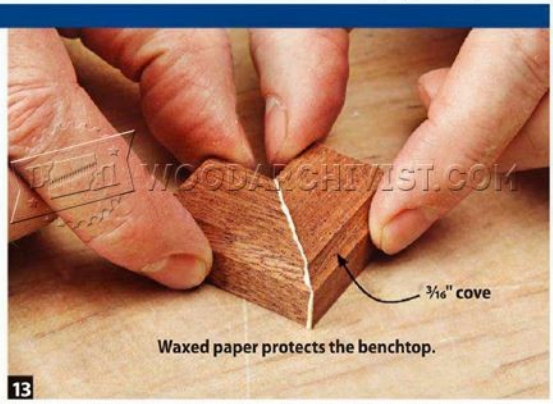
Add the feet, hinge, and finish

To match the lid and box, and to avoid showing end grain, we glued together short, mitered pieces for the feet. You'll need a 3/16" cove bit or a ⅜" round-nose bit to rout the profile. Then, we attached the lid with a continuous hinge [**Sources**].

MAKE THE MITERED FEET



12



13

From the accent wood, make an 18"-long blank ½" thick and about 1" wide. Rout a 3/16" cove onto one edge. After miter-cutting one end on the tablesaw, use a crosscut handsaw to cut a half-foot to length. (We used a bench hook with fence to guide the saw.) Miter-cut the end again, and repeat the process to make eight half-feet. Apply glue to the miters of mating foot pieces, and then, on waxed paper, rub the pieces together until they align and "grab."

ROUT THE STOPPED HINGE MORTISE

14

15

To make the hinge mortise on the top back edge, install a ¾" straight bit in your router table and set its height equal to the thickness of the closed hinge. Set the fence to cut a rabbet the width of the closed hinge. Attach stopblocks for the beginning and ending points of the cut. Anchor the box against the right block, pivot it into the bit, and then run it along the fence until it contacts the left block. Square up the rounded ends of the mortise with a chisel.

INSTALL THE LID HINGE TO THE BOX

16

With a scrap clamped against the back of the box, position the hinge in the mortise against the scrap. Drill pilot holes and secure with #1×⅜" brass screws in the outer holes only. (You'll remove the hinge before finishing.)

ATTACH THE LID

17

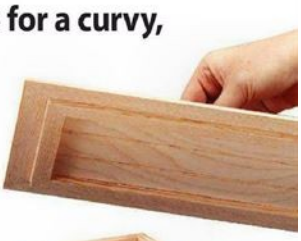
Shim between the hinge leaves with veneer to keep the top leaf level with the box edge. Attach double-faced tape to the lid side of the hinge, press the lid firmly against the tape, carefully open the lid, and then drill all pilot holes and attach the lid with two screws.

ATTACH THE FEET

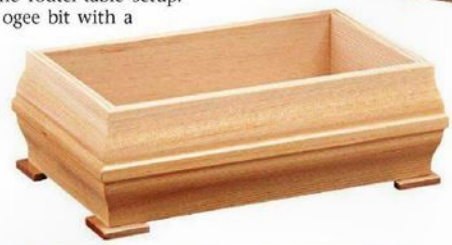
18

Finally, apply glue to the corners of the box's bottom edges, rub the feet into place, and then clamp tightly, making sure all feet line up evenly. When dry, finish-sand any areas needing it, remove the hinge, and apply a finish of your choice. Reinstall the hinge when the finish has dried.

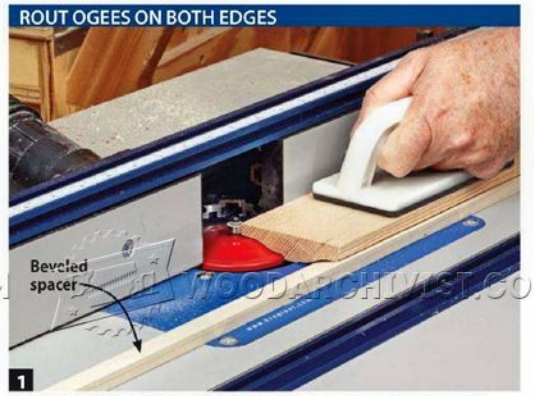
Double up the profile for a curvy, mirrored look



With this design, you simply rout the same profile along each edge of your side blanks, leaving a raised middle section. One advantage to this box design: You create the box and lid pieces at the same time with only one router-table setup. We used an ogee bit with a 1½" radius [**Sources**] for the box-side and lid profiles. You'll also need a ¾" straight bit.



ROUT OGEES ON BOTH EDGES



1

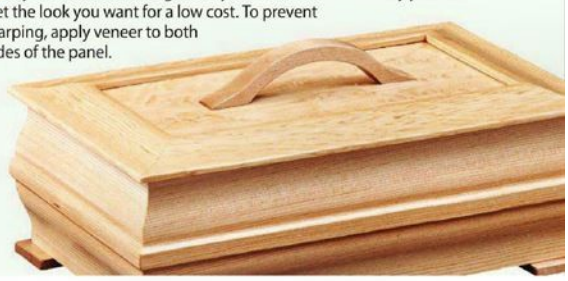
Beginning with three ¾"× 3½"×2' blanks, rout the ogee profile along both edges in ⅛"-deep increments. We used double-faced tape to secure a 15°-beveled spacer to the router table to help support the tippy blank; use one that fits your routed profile. Move the spacer closer to the fence with each cut.

SHOP TIP

Search out or make your own unique panels

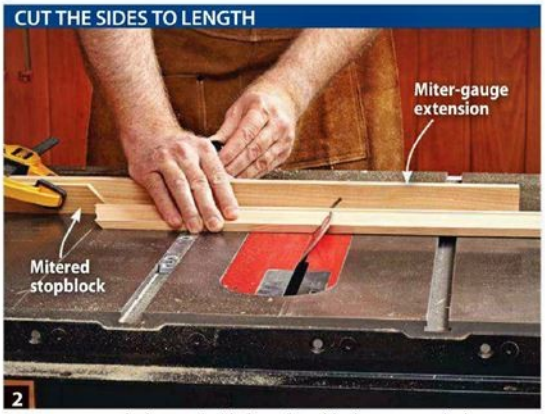
When building small boxes such as these with thin lid and bottom panels, it's best to use ¼" or thinner sheet stock:

- Check out the paneling section at a home center. The Douglas fir and maple box shown *below* features a lid panel with bird's-eye maple veneer, which we discovered on the back of common beadboard paneling. What a find for $12!
- Buy ⅛" hardboard and glue on your own veneer. This way you can get the look you want for a low cost. To prevent warping, apply veneer to both sides of the panel.



WOODARCHIVIST.COM

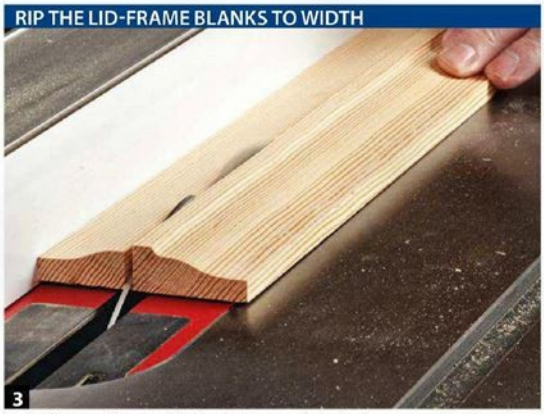
CUT THE SIDES TO LENGTH



2

Saw a groove on the bottom inside face of two blanks to accept the box bottom panel. Next, because you must rest the flat *inside* of the box-side blank on the tablesaw top, put the miter gauge in a slot so the blade tilts *away* from the stopblock at a 45° angle. Cut the box sides to length. After cutting the bottom panel to fit and sanding the inside surfaces, glue the box together.

RIP THE LID-FRAME BLANKS TO WIDTH



3

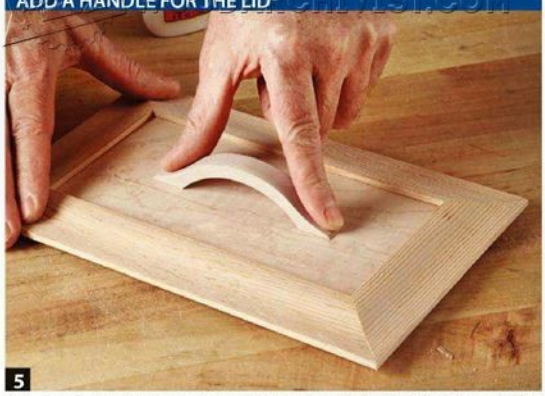
From the remaining profile blank, rip away the raised center section, leaving two profiled lid-frame blanks. Cut a ¼"-deep lid-panel groove along the thicker edge of each blank ⅛" from the top, and miter-cut the frame pieces to match the box length and width. Cut a panel to fit. We used ¼" beadboard [**Shop Tip** on *page 58*]. Sand all the pieces, and glue the lid together.

RABBET THE LID TO FIT THE BOX

4

After the lid has dried, sand smooth any uneven miters. Next, using a straight bit, rout a rabbet on the underneath side, sneaking up on the width until the lid fits into the box.

ADD A HANDLE FOR THE LID



5

Cut a handle to suit your taste, sand it smooth, and glue it to the lid panel. Glue on simple square feet made from ¼"-thick stock—end grain will show on this box. Finish-sand and apply a finish.

Sources

Raised-panel bits: Freud Quadra-Cut cove bit, no. 99-518, $105; Freud Quadra-Cut ogee bit, no. 99-520, $105; 800-334-4107, freudtools.com.

8" (200 mm) brass stop hinge: no. 00D80.05, $2.90, Lee Valley, 800-871-8158, leevalley.com.
#1x⅜" F.H. brass screws: no. 91Z01.02X, $.90 per 10-pack, Lee Valley.